

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 12

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHIANG FU and YU-CHYI HARN

Appeal No. 2000-1164
Application No. 08/899,176

ON BRIEF

Before PAK, KRATZ, and JEFFREY T. SMITH, Administrative Patent Judges.

KRATZ, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's refusal to allow claims 1-20, as amended subsequent to final action.¹ No other claims are pending in this application.

¹ An amendment after final rejection filed on February 26, 1999 was approved for entry by the examiner, but the amendments have not, as yet, been clerically entered. See the advisory action (Paper No. 8) mailed March 10, 1999.

BACKGROUND

Appellants' invention relates to a method for cleaning wafers with ionized water. The ionized water is obtained by adding ions to a deionized (DI) water, that is, a regular DI water is doped with ions such as OH^- , F^- , Cl^- , NH_4^+ and H^+ . See page 7, line 10 through page 8, line 10 of appellants' specification. Claims 8, 10 and 13 are reproduced below.

8. A method for cleaning a wafer in a scrubber comprising the steps of:
 providing a quantity of deionized water to a scrubber,
 doping said quantity of deionized water with at least one species of ions such that the resistivity of the water is less than 18×10^6 Ohm-cm, and
 scrubbing a surface of said wafer with said doped deionized water.

10. A method according to claim 8, wherein said at least one species of ions is added to said quantity of deionized water by adding carboxylic acid at a mixing ratio of not smaller than 1:100 (acid/water).

13. A method according to claim 8, wherein said doped deionized water contacting said wafer under a pressure of not less than 1000 psi.

In addition to alleged admitted prior art in appellants' specification (Background of the Invention, especially page 2, lines 10-13),² the prior art references of record relied upon by the examiner in rejecting the appealed claims are:

² See answer, page 7.

Yamashita et al. (Yamashita) 4,569,695 Feb. 11, 1986

Eitoku, "Post-CMP Cleaning Technology," Semicon Korea 95 (January 19, 1995), pages 29-36.

Kern (editor), HANDBOOK OF SEMICONDUCTOR WAFER CLEANING TECHNOLOGY, Noyes Publications (1993), pages 28-67 and 78.

Claims 1, 2, 6, 8, 9 and 15 stand rejected under 35 U.S.C. § 102 as anticipated by Eitoku. Claims 1-6, 8, 9 and 15 stand rejected under 35 U.S.C. § 102 as anticipated by Yamashita. Claims 7, 13, 14, 19 and 20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Eitoku in view of the admitted prior art in the specification (Background of the Invention, especially page 2, lines 10-13). Claims 10-12 and 16-18 stand rejected under 35 U.S.C. § 103 as unpatentable over Kern taken in combination with Eitoku.

We refer to the brief and to the answer for a complete exposition of the opposing viewpoints expressed by appellants and the examiner concerning the issues before us.

OPINION

Having carefully considered each of appellants' arguments set forth in the brief, appellants have not persuaded us of reversible error on the part of the examiner with respect to the rejections involving Eitoku as part or all of the prior art evidence relied upon by the examiner. The examiner's § 102

rejection of claims 1-6, 8, 9 and 15 over Yamashita is another matter since the examiner has not shown that Yamashita describes all of the claimed steps. Accordingly, we will affirm the examiner's rejections involving the Eitoku reference for substantially the reasons set forth by the examiner in the answer and shall reverse the examiner's § 102 rejection of claims 1-6, 8, 9 and 15 over Yamashita. We add the following for emphasis.

For each of the four separate rejections advanced by the examiner, appellants have grouped the claims together in contesting each such rejection. See brief, pages 4 and 5. Accordingly, the claims stand or fall together with respect to each of the examiner's rejections. We select claim 8 as the representative claim on which we decide this appeal for both of the examiner's § 102 rejections. We select claim 13 as the representative claim for the examiner's § 103 rejection of claims 7, 13, 14, 19 and 20 and select claim 10 as the representative claim for the examiner's § 103 rejection of claims 10-12 and 16-18.

§ 102 Rejection Over Eitoku

Initially we note that anticipation by a prior art reference does not require that reference to recognize either the inventive concept of the claimed subject matter or the inherent properties

that may be possessed by the prior art reference. See Verdegaaal Bros. Inc. v. Union Oil Co., 814 F.2d 628, 633, 2 USPQ2d 1051, 1054 (Fed. Cir.), cert. denied, 484 U.S. 827 (1987). A prior art reference anticipates the subject matter of a claim when the reference discloses every feature of the claimed invention, either explicitly or inherently (see Hazani v. Int'l Trade Comm'n, 126 F.3d 1473, 1477, 44 USPQ2d 1358, 1361 (Fed. Cir. 1997) and RCA Corp. v. Applied Digital Data Systems, Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984)); however, the law of anticipation does not require that the reference teach what the appellants are claiming, but only that the claims on appeal "read on" something disclosed in the reference (see Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983), cert. denied, 465 U.S. 1026 (1984)).

Anticipation under this section is a factual determination. See In re Baxter Travenol Labs., 952 F.2d 388, 390, 21 USPQ2d 1281, 1283 (Fed. Cir. 1991) (citing In re Bond, 910 F.2d 831, 833, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990)). In the case before us, we determine that Eitoku discloses, either expressly or inherently, every limitation of the invention set forth in representative claim 8.

The examiner has found that Eitoku describes a method for scrubbing (cleaning) a wafer wherein DI water and an ion doping chemical (HF or NH_4OH) that dissociates in water are used for scrubbing the wafer surface. See pages 5 and 6 of the answer and pages 32-34 of Eitoku. Moreover, the examiner has found that the resistivity of the solution resulting from the simultaneous use of DI water and the ion forming chemical (HF or NH_4OH) that is used in scrubbing a wafer in Eitoku would be less than 18×10^6 ohm-cm as required by representative appealed claim 8. The examiner (answer, pages 5, 10 and 11) determined the relative resistivity of the scrubbing solution of Eitoku based on appellants' acknowledgment (specification, page 3, lines 11-21 and page 10, lines 16-19) that the resistivity of DI water without chemicals (ions) added would be about 18×10^6 ohm-cm or more. Concerning this matter, the examiner essentially maintains that the DI water solution having ionizable chemicals added thereto as taught by Eitoku would be more conductive due to the presence of the ions and, consequently, the resistivity value thereof would be less than the 18×10^6 ohm-cm resistivity for a regular DI water. We agree.

In a case such as this, it is incumbent upon appellants to prove that the prior art scrubbing method does not in fact

possess the solution characteristics relied on. See In re Spada, 911 F.2d 705, 708, 15 USPQ 1655, 1658 (Fed. Cir. 1990); In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980); In re Best, 562 F.2d 1252, 1254-55, 195 USPQ 430, 433 (CCPA 1977); In re Glass, 474 F.2d 1015, 1019, 176 USPQ 529, 532 (CCPA 1973); In re Ludtke, 441 F.2d 660, 664, 169 USPQ 563, 566 (CCPA 1971); In re Swinehart, 439 F.2d 210, 213, 169 USPQ 226, 229 (CCPA 1971).

Here, appellants have not done so.

While appellants (brief, page 6) urge that Eitoku "does not teach doping a quantity of deionized water with at least one species of ions such that **the resistivity of water is less than 18×10^6 ohm-cm,**" appellants have not offered any evidence or scientific reasoning to rebut the examiner's determination that the combination of DI water and the ion forming chemical (HF or NH_4OH) that is used in scrubbing a wafer in Eitoku constitutes an ion doping step resulting in a water solution with a resistivity of less than 18×10^6 ohm-cm as required by representative appealed claim 8.

Hence, we agree with the examiner that Eitoku describes a method that corresponds to appellants' method as recited in representative claim 8 and that any functional characteristics recited in claim 8 to the extent that they are not expressly

described by Eitoku would have been obtained by using DI water and chemicals in the scrubbing step in the method set forth in Eitoku.

In light of the above and for reasons as set forth in the answer, appellants' generalized unsubstantiated contentions to the contrary are not found to be persuasive. We shall, therefore, sustain the examiner's § 102 rejection of claims 1, 2, 6, 8, 9 and 15 over Eitoku.

§ 103 Rejection Over Eitoku and the admitted prior art

Appellants do not argue for the patentability of representative claim 13 based on the pressure recited therein. Nor do appellants dispute with any particularity the examiner's determination that the scrubbing pressure recited in representative claim 13 is well-known as acknowledged by appellants. Rather, appellants urge that the ion doping step of claim 8, from which claim 13 depends, is not suggested by the applied references. However, for the reasons advanced above and in the answer, we find that Eitoku describes such a doping step and consequently do not find that argument convincing. Appellants additionally argue (brief, pages 11 and 12) that the rejection is based on hindsight reconstruction. However, we agree with the examiner that one of ordinary skill in the art

would have been led to employ a workable and typically used water pressure above the 1,000 psi. minimum called for in representative claim 8 in the scrubbing process of Eitoku, such typical pressures being admitted by appellants at page 2 of the specification to be known in the art. Accordingly, we shall sustain the examiner's § 103 rejection of claims 7, 13, 14, 19 and 20 over Eitoku and the admitted prior art.

§ 103 Rejection Over Kern and Eitoku

With respect to this ground of rejection and representative claim 10, appellants again contend that the ion doping step of claim 8, from which claim 10 depends, is not taught. However, we disagree for the reasons set forth above and in the answer. Appellants do not argue the additional limitations of claim 10 with any particularity. It follows that we shall also sustain the examiner's § 103 rejection of claims 10-12 and 16-18 over Kern and Eitoku.

§ 102 Rejection Over Yamashita

Each of the claims rejected under § 102 as anticipated by Yamashita require a method for cleaning wafers wherein deionized water is doped or has ions added thereto. Yamashita is concerned with a method for cleaning photo-masks. Yamashita discloses the use of weak acidic aqueous solutions or a weak alkaline aqueous

solution in the cleaning process. The examiner urges that "[i]t is inherent that the disclosed aqueous solutions are prepared by dissolving the chemicals or their solutions in the pure deionized water suitable for use in the semiconductor industry" (answer, page 6).

Appellants (brief, page 7), on the other hand, have argued that Yamashita "does not teach the addition of ions into **deionized water** . . ." (emphasis added).

Thus, a central question before us is whether the examiner's assertion of inherency is reasonable. We answer that question in the negative since the examiner has not provided a sufficient basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent use of deionized water in Yamashita necessarily occurs in their photo-mask cleaning process. It is noted that a photo-mask, as cleaned in Yamashita, is used as a light exposure mask during the manufacture of a semiconductor device (Yamashita, column 1, lines 6-11), the photo-mask not being a part of the wafer used in making the semiconductor device. It is the cleaning of such a wafer that is the subject of the present application. Accordingly, we shall reverse the examiner's § 102 rejection of claims 1-6, 8, 9 and 15 over Yamashita.

OTHER ISSUES

In view of the above discussion and our affirmance of the examiner's § 103 rejection of claim 10 over the combined teachings of Kern and Eitoku, the examiner should review the subject matter of claims 3-5 and determine whether or not the latter claims define patentable subject matter over the combined teachings of Kern and Eitoku.

CONCLUSION

The decision of the examiner to reject claims 1, 2, 6, 8, 9 and 15 under 35 U.S.C. § 102 as anticipated by Eitoku, to reject claims 7, 13, 14, 19 and 20 under 35 U.S.C. § 103 as being unpatentable over Eitoku in view of the admitted prior art in the specification (Background of the Invention, especially page 2, lines 10-13) and to reject claims 10-12 and 16-18 under 35 U.S.C. § 103 as unpatentable over Kern taken in combination with Eitoku is affirmed. The decision of the examiner to reject claims 1-6, 8, 9 and 15 under 35 U.S.C. § 102 as anticipated by Yamashita is reversed.

No time period for taking any subsequent action in
connection with this appeal may be extended under 37 CFR
§ 1.136(a).

AFFIRMED-IN-PART

CHUNG K. PAK)	
Administrative Patent Judge)	
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PETER F. KRATZ)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS
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)	INTERFERENCES
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APPEAL NO. - JUDGE KRATZ
APPLICATION NO.

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DECISION: **ED**

Prepared By:

DRAFT TYPED: 04 Jun 03

FINAL TYPED: